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STATION NOTES
CENTRAL STATES FOREST EXPERIMENT STATION
COLUMBUS 15, OHIO

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TREE DEFECTS COMMON IN THE UPLAND FORESTS OF SOUTHERN ILLINOIS

Nearly 75 percent of the trees in the upland forests of southern Illinois were defective in 1936. Fire scars and branch stubs were the most frequent causes of defect. Twenty-two percent of the total volume of the defective trees was cull (table 1).

Table 1.--Proportion of trees in the upland forests of southern Illinois that were defective together with cull percents

PERCENT OF ALL SAMPLE TREES

Species	Kind of defect						Trees without defect
	Butt rot		Branch stubs	Insects	Miscellaneous 1/	Total	
	Fire	Other					
White oak	35	5	7	2	6	55	45
Black oak	38	6	26	7	11	88	12
Scarlet oak	12	6	25	21	7	71	29
Other oaks	38	3	6	3	23	73	27
Yellow-poplar	52	19	0	0	15	86	14
Hickory	65	3	0	0	3	71	29
Miscellaneous	50	5	30	0	0	85	15
All trees	36	6	16	7	8	73	27

CULL PERCENT OF TOTAL CUBIC VOLUME OF DEFECTIVE TREES

All trees	5	2	7	1	7	22	--

1/ Includes felling injuries, lightning damage, frost cracks, heart check, wind shake, and others.

The above data are based on measurements of the stems of 487 trees to determine the occurrence of tree defects, the principal kinds, and the agents causing them.1/ The sample trees were cut from three 1-acre plots located in the mixed upland hardwood forests of southern Illinois. In addition, the trees removed in a 20-acre commercial operation were studied.

1/ Field work was completed in 1936 by John G. Kuenzel, Central States Forest Experiment Station and personnel of the Shawnee National Forest. Decay agents were identified by the Division of Forest Pathology, Bureau of Plant Industry, Soils, and Agricultural Engineering.

Cull percents:--The percent of gross volume of all sample trees culled because of defect is summarized in table 2. These cull percents have local value only, but are a good indication of the volume of material affected by the various kinds of defect.

Table 2.--Cull percents by species and diameter class1/

Species	Small poles 3.6-7.5 inches	Large poles 7.6-11.5 inches	Sawtimber 11.6 inches +
	-Percent of gross volume-		
White oak	8.4	19.6	16.7
Black oak	3.0	29.5	16.8
Scarlet oak	11.4	20.1	23.8
Other oaks	--	--	22.9
Yellow-poplar	12.1	6.0	8.3
Hickory	29.1	25.6	26.5
Miscellaneous	--	--	23.3

1/ Diameter at 4 1/2 feet above ground.

Decay agents:--To determine the agents responsible for decay, 306 samples of decayed wood were examined. From them 119 pure cultures were made and seven genera of fungi were found. In order of their frequency, they were Stereum sp., Polyporous sp., Poria sp., Fomes sp., Hydnum sp., Corticum sp., and Armillaria sp. A few others occurred but were not identified.

Forest fire history:--Analysis of fire scars on the sample trees indicated that the earliest fire on the study areas occurred in the season 1734-35. Bad fire years occurred during the seasons of 1884-85, 1894-95, 1914-15, 1923-24 and 1929-30. The scars also showed that fires occurred in all but two years during the period 1906-1935.

Although this study was completed in 1936, the proportion of defective trees in the upland forests of southern Illinois has decreased only slightly. In the main, stands have not been managed or protected from fire. On those areas where fire has been practically eliminated, such as the Shawnee National Forest and state forests, damage to the older trees has been reduced, and dense young stands of desirable species have developed. Protection of all forest areas from fire and grazing will greatly reduce the defective volume in forests of the future. Early removal of defective trees plus management for a clean, vigorous forest will reduce defects resulting from branch stubs, insects, and other causes.

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